

PATENT CLAIMS

1. A process for the preparation of water-absorbent, foam-type polymer structures,
wherein an aqueous composition (A) containing
5 (A1) water,
(A2) one or more polymers based at least on
 - (α 1) from 55 to 100 wt.% of a polymerized, monoethylenically unsaturated,
acid-group-containing monomer or its salt, and on
 - (α 2) from 0 to 45 wt.% of a polymerized, monoethylenically unsaturated
10 monomer that is copolymerizable with (α 1),
wherein the sum of the amounts by weight of (α 1) and (α 2) is 100 wt.% and
wherein at least 31.5 wt.% of the monomers, based on the total weight of the
monomers (α 1) and (α 2), are acrylic acid or salts of acrylic acid,
(A3) one or more crosslinkers,
15 (A4) one or more blowing agents,
(A5) one or more surfactants,
(A6) and optionally further auxiliary substances,
is foamed, and the foamed aqueous composition is then heated at a temperature in a
range of from 50 to 300°C, so that the polymer (A2) crosslinks at least partially and
20 the content of water (A1) is adjusted to not more than 15 wt.%, based on the total
weight of the foam-type polymer structure that forms.
2. Process according to claim 1, wherein the polymer (A2) has a number-average
molecular weight of at least 10,000 g/mol.
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3. Process according to claim 1 or 2, wherein the foamed composition has a foam liter
weight of from 10 to 1000 g/l.
4. Process according to one or more of claims 1 to 3, wherein the surface of the
30 absorbent, foam-type polymer structure is smoothed in a further process step.
5. A water-absorbent, foam-type polymer structure obtainable by a process according
to claim 1 to 4.

6. Water-absorbent, foam-type polymer structure according to claim 5, wherein the polymer structure has at least one of the following properties:
- (β1) an AUL (absorbency under load) of 0.9% NaCl solution under a load of 0.3 psi of at least 10 g/g;
- (β2) a rate of absorption of more than 1 g/g/sec;
- (β3) a maximum absorption capacity in a range of from 20 to 300 g/g;
- (β4) a CRC (centrifugation retention capacity) in a range of from 7.5 to 100 g/g;
- (β5) a mean pore size in a range of from 0.01 to 2 mm;
- (β6) a mean pore density in a range of from 60 to 1200 g/m².
7. A water-absorbent, foam-type polymer structure containing
- (B1) from 20 to 99.99 wt.%, based on the total weight of the polymer structure, of one or more crosslinked polymers based at least on
- (γ1) from 50 to 99.9 wt.% of a polymerized, monoethylenically unsaturated, acid-group-containing monomer or its salt,
- (γ2) from 0 to 45 wt.% of a polymerized, monoethylenically unsaturated monomer that is copolymerizable with (γ1), and
- (γ3) from 0.001 to 5 wt.% of one or more crosslinkers,
- wherein the sum of the amounts by weight of (γ1) to (γ3) is 100 wt.% and at least 31.5 wt.% of the monomers, based on the total weight of the monomers (γ1) and (γ2), are acrylic acid or a salt thereof,
- (B2) from 0.01 to 30 wt.% of one or more additives, based on the total weight of the polymer structure, and
- (B3) from 0 to 15 wt.% of water, based on the total weight of the polymer structure,
- wherein the sum of the amounts by weight of (B1) to (B3) is 100 wt.% and wherein the water-absorbent, foam-type polymer structure has at least one of the properties (β1) to (β6) defined in claim 6.
8. Composite comprising a water-absorbent, foam-type polymer structure according to claim 5 to 7 and a substrate.

9. Process for the production of a composite according to claim 8, wherein a foamed composition as defined in claim 1 to 3 is brought into contact with at least a portion of the surface of a substrate and the substrate brought into contact with the foamed composition is then heated at a temperature in a range of from 50 to 300°C so that the polymer (A2) crosslinks at least partially, the content of water (A1) is adjusted to not more than 15 wt.%, based on the total weight of the foam-type polymer structure that forms, and the resulting foam-type polymer structure is immobilized on at least a portion of the surface of the substrate.
10. Process according to claim 9, wherein the substrate is a film of polymers, such as, for example, of polyethylene, polypropylene or polyamide, a metal, a nonwoven, a fluff, a tissue, a woven fabric, a natural or synthetic fibre, or another foam.
11. Process according to claim 9 or 10, wherein templates are used during application of the foamed, aqueous composition to the substrate.
12. A process for the production of a composite according to claim 8, wherein at least a portion of the surface of a water-absorbent, foam-type polymer structure according to any one of claims 5 to 7 is brought into contact with at least a portion of the surface of a substrate, and the polymer structure is then immobilized on at least a portion of the surface of the substrate.
13. Process according to claim 12, wherein the substrate is a thermoplastic sheet-form structure.
14. Composite obtainable by a process according to one or more of claims 9 to 13.
15. Use of a water-absorbent, foam-type polymer structure according to one or more of claims 5 to 7 or of a composite according to claim 8 or 14 in chemical products.
16. Chemical products containing a foam-type polymer structure according to one or more of claims 5 to 7 that absorbs water and aqueous liquids, or a composite according to claim 9 or 14.